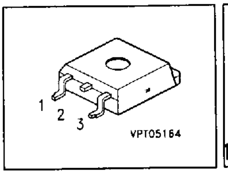
SIPMOS® Power Transistor

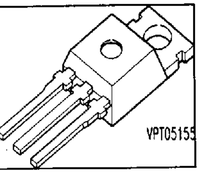
Features

- N channel
- Enhancement mode
- Avalanche rated
- dv/dt rated
- 175°C operating temperature

Product Summary

Drain source voltage	V_{DS}	30	V
Drain-Source on-state resistance	$R_{DS(on)}$	0.023	Ω
Continuous drain current	I_D	30	A





Type	Package	Ordering Code	Packaging
SPP30N03	P-TO220-3-1	Q67040-S4736-A2	Tube
SPB30N03	P-TO263-3-2	Q67040-S4736-A3	Tape and Reel

Pin 1	Pin 2	Pin 3
G	D	S

Maximum Ratings, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous drain current	I_D		A
T_C = 25 °C, 1)		30	
T_C = 100 °C		30	
Pulsed drain current T_C = 25 °C	I_{Dpulse}	120	
Avalanche energy, single pulse I_D = 30 A, V_{DD} = 25 V, R_{GS} = 25 Ω	E_{AS}	145	mJ
Avalanche energy, periodic limited by T_{jmax}	E_{AR}	7.5	
Reverse diode dv/dt I_S = 30 A, V_{DS} = 24 V, di/dt = 200 A/µs, T_{jmax} = 175 °C	dv/dt	6	kV/µs
Gate source voltage	V_{GS}	±20	V
Power dissipation T_C = 25 °C	P_{tot}	75	W
Operating and storage temperature	T_j , T_{stg}	-55... +175	°C
IEC climatic category; DIN IEC 68-1		55/175/56	

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Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - case	R_{thJC}	-		2	K/W
Thermal resistance, junction - ambient, leded	R_{thJA}	-	-	62	
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	-	62	
@ 6 cm^2 cooling area[2)]		-	-	40	

Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain- source breakdown voltage V_{GS} = 0 V, I_D = 0.25 mA	$V_{(BR)DSS}$	30	-	-	V
Gate threshold voltage, $V_{GS} = V_{DS}$ I_D = 50 µA	$V_{GS(th)}$	2.1	3	4	
Zero gate voltage drain current	I_{DSS}				µA
V_{DS} = 30 V, V_{GS} = 0 V, T_j = 25 °C			0.1	1	
V_{DS} = 30 V, V_{GS} = 0 V, T_j = 150 °C		-	-	100	
Gate-source leakage current V_{GS} = 20 V, V_{DS} = 0 V	I_{GSS}	-	10	100	nA
Drain-Source on-state resistance V_{GS} = 10 V, I_D = 30 A	$R_{DS(on)}$	-	0.014	0.023	Ω

[1] current limited by bond wire

[2] Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6 cm2 (one layer, 70µm thick) copper area for drain connection. PCB is vertical without blown air.

Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, I_D = 30 A	g_{fs}	10	23	-	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	860	1075	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	-	450	545	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	-	195	245	
Turn-on delay time V_{DD} = 15 V, V_{GS} = 10 V, I_D = 30 A, R_G = 12 Ω	$t_{d(on)}$	-	16	24	ns
Rise time V_{DD} = 15 V, V_{GS} = 10 V, I_D = 30 A, R_G = 12 Ω	t_r	-	38	57	
Turn-off delay time V_{DD} = 15 V, V_{GS} = 10 V, I_D = 30 A, R_G = 12 Ω	$t_{d(off)}$	-	35	53	
Fall time V_{DD} = 15 V, V_{GS} = 10 V, I_D = 30 A, R_G = 12 Ω	t_f	-	36	54	

Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Gate to source charge V_{DD} = 24 V, I_D = 30 A	Q_{gs}	-	4	6	nC
Gate to drain charge V_{DD} = 24 V, I_D = 30 A	Q_{gd}	-	13.6	20	
Gate charge total V_{DD} = 24 V, I_D = 30 A, V_{GS} = 0 to 10 V	Q_g	-	25	38	
Gate plateau voltage V_{DD} = 24 V, I_D = 30 A	$V_{(plateau)}$	-	5.6	-	V

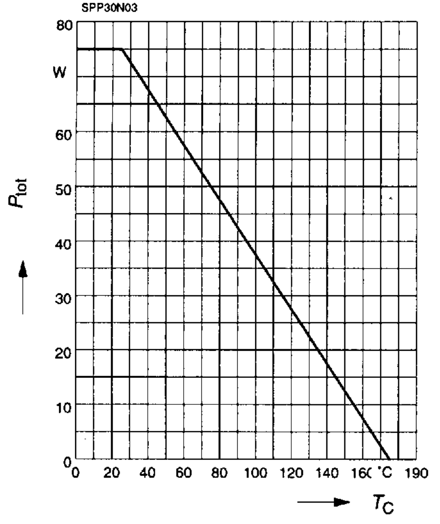
Reverse Diode

Parameter	Symbol	min.	typ.	max.	Unit
Inverse diode continuous forward current T_C = 25 °C	I_S	-	-	30	A
Inverse diode direct current,pulsed T_C = 25 °C	I_{SM}	-	-	120	
Inverse diode forward voltage V_{GS} = 0 V, I_F = 60 A	V_{SD}	-	1.15	1.7	V
Reverse recovery time V_R = 15 V, I_F=I_S , di_F/dt = 100 A/µs	t_{rr}	-	38	57	ns
Reverse recovery charge V_R = 15 V, I_F=I_S , di_F/dt = 100 A/µs	Q_{rr}	-	0.032	0.048	µC

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Power Dissipation

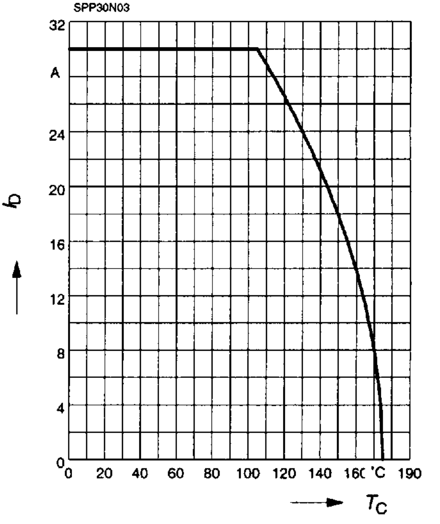
$P_{tot} = f(T_C)$



Drain current

$I_D = f(T_C)$

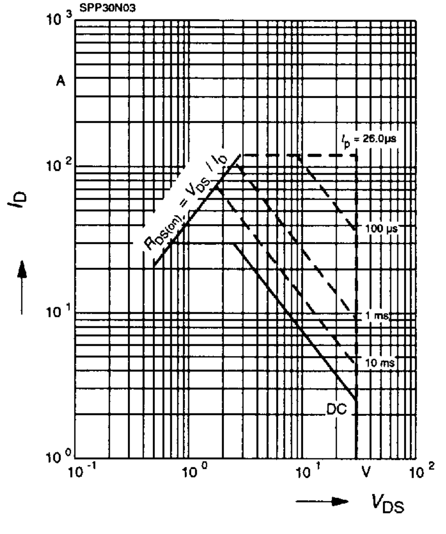
parameter: $V_{GS} \geq 10$ V



Safe operating area

$I_D = f(V_{DS})$

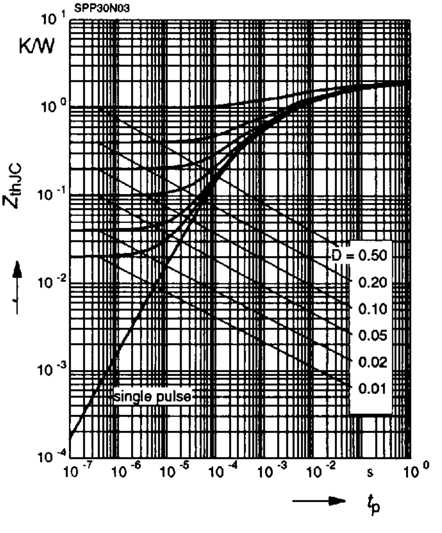
parameter : $D = 0$, $T_C = 25$ °C



Transient thermal impedance

$Z_{thJC} = f(t_p)$

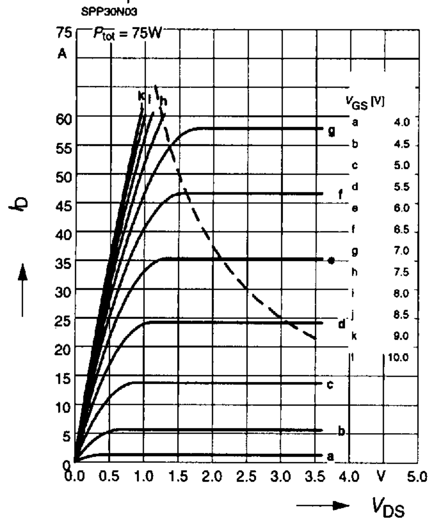
parameter : $D = t_p/T$



Typ. output characteristics

$I_D = f(V_{DS})$

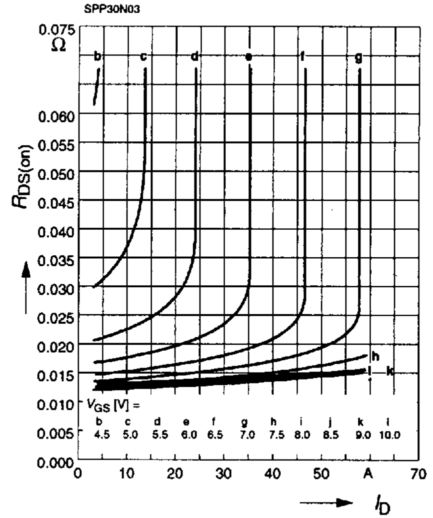
parameter: t_p = 80 µs



Typ. drain-source-on-resistance

$R_{DS(on)} = f(I_D)$

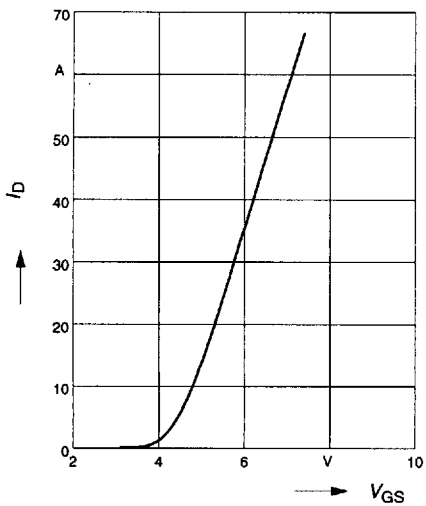
parameter: V_{GS}



Typ. transfer characteristics $I_D = f(V_{GS})$

parameter: t_p = 80 µs

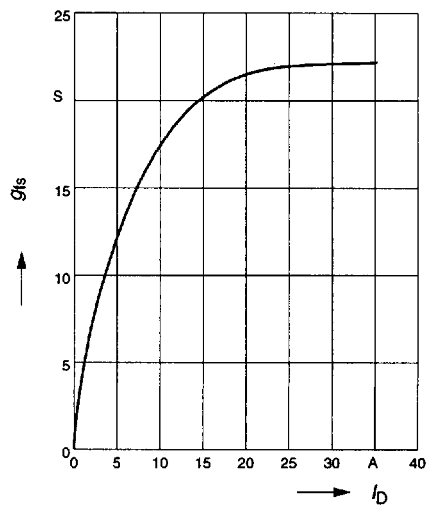
$V_{DS} \geq 2 \times I_D \times R_{DS(on)\,max}$



Typ. forward transconductance

$g_{fs} = f(I_D)$; T_j = 25°C

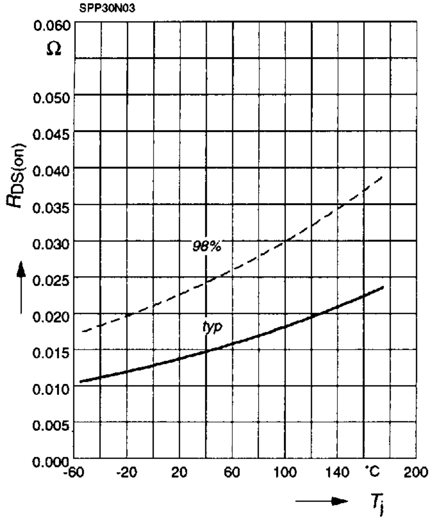
parameter: g_{fs}



Drain-source on-resistance

$R_{DS(on)} = f(T_j)$

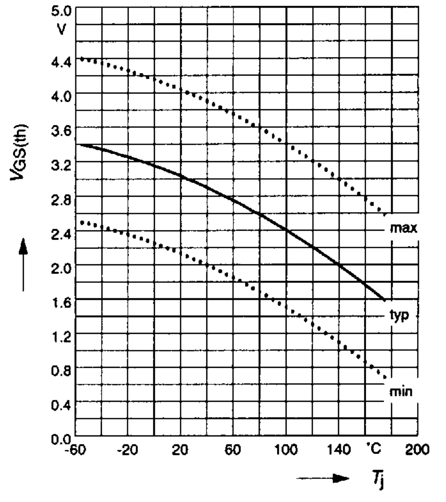
parameter : I_D = 30 A, V_{GS} = 10 V



Gate threshold voltage

$V_{GS(th)} = f(T_j)$

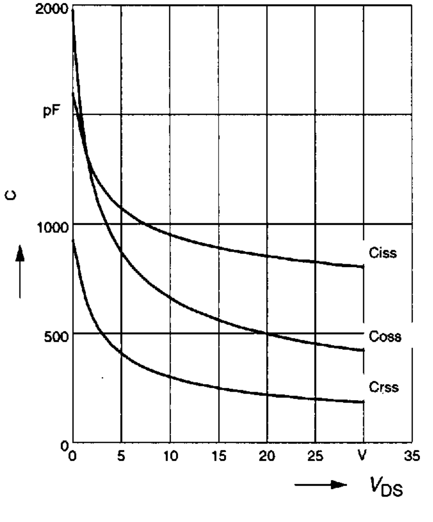
parameter : $V_{GS} = V_{DS}$, I_D = 50 µA



Typ. capacitances

C = $f(V_{DS})$

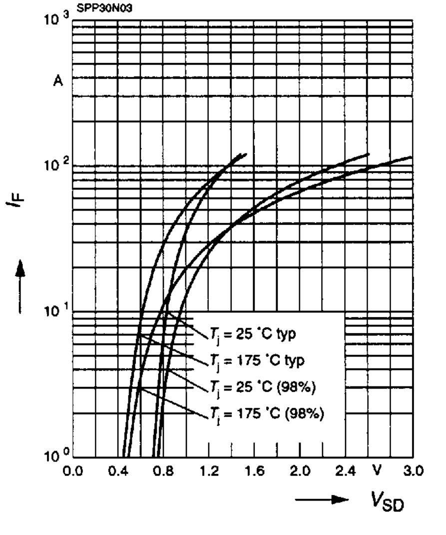
parameter: V_{GS} = 0 V, f = 1 MHz



Forward characteristics of reverse diode

$I_F = f(V_{SD})$

parameter: T_j , t_p = 80 µs

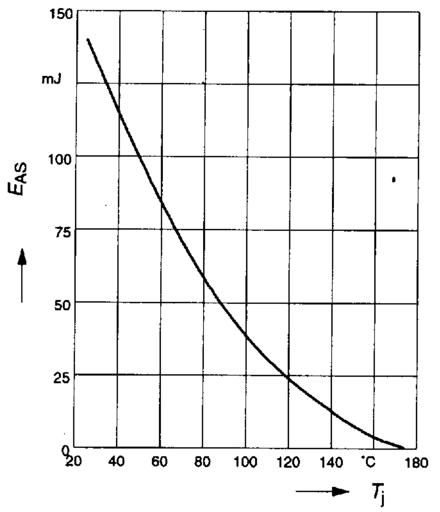


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Avalanche Energy $E_{AS} = f(T_j)$

parameter: I_D = 30 A, V_{DD} = 25 V

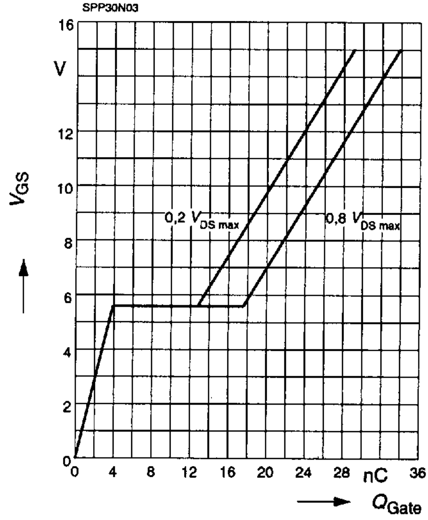
R_{GS} = 25 Ω



Typ. gate charge

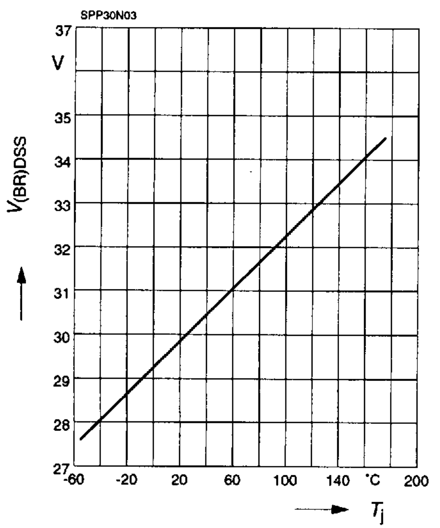
$V_{GS} = f(Q_{Gate})$

parameter: $I_{D\ puls}$ = 30 A



Drain-source breakdown voltage

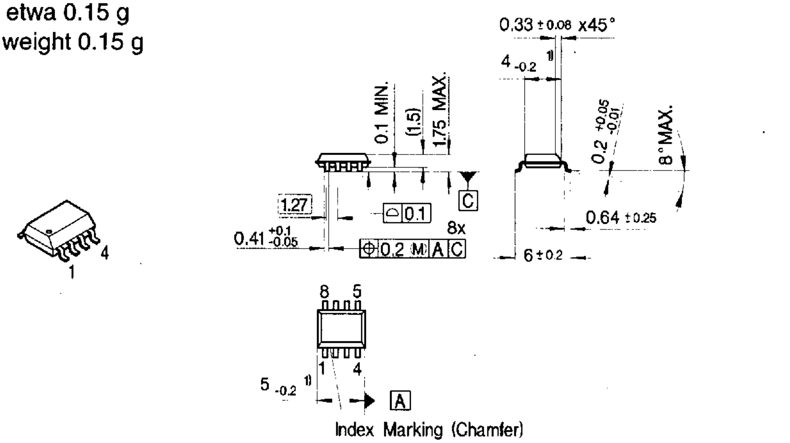
$V_{(BR)DSS} = f(T_j)$



Gehäusemaßbilder
(Maße in mm, wenn nicht anders angegeben)

Package Outlines
(Dimensions in mm, unless otherwise specified)

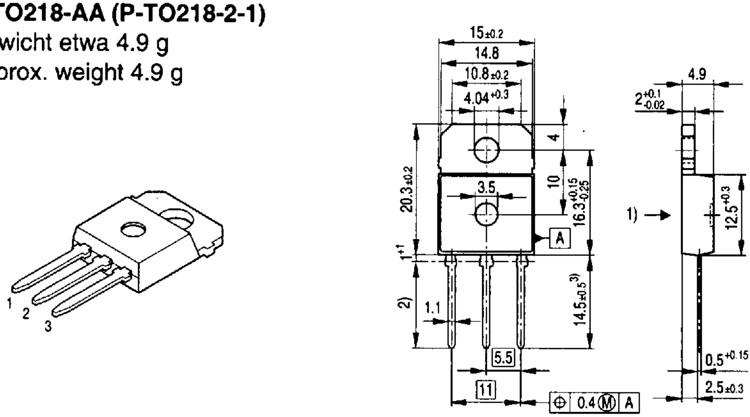
P-DSO-8-6/-7
Gewicht etwa 0.15 g
Approx. weight 0.15 g



1) Does not include plastic or metal protrusion of 0.15 max. per side

Bild 16 **Figure 16**

P-TO218-AA (P-TO218-2-1)
Gewicht etwa 4.9 g
Approx. weight 4.9 g



1) Punch direction, burr max. 0.04
2) Dip tinning
3) Max. 15.5 by dip tinning
press burr max. 0.05
radii not dimensioned max. 0.2

GPT05156

Bild 17 **Figure 17**

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P-TO220-3-1
Gewicht etwa 1.8 g
Approx. weight 1.8 g

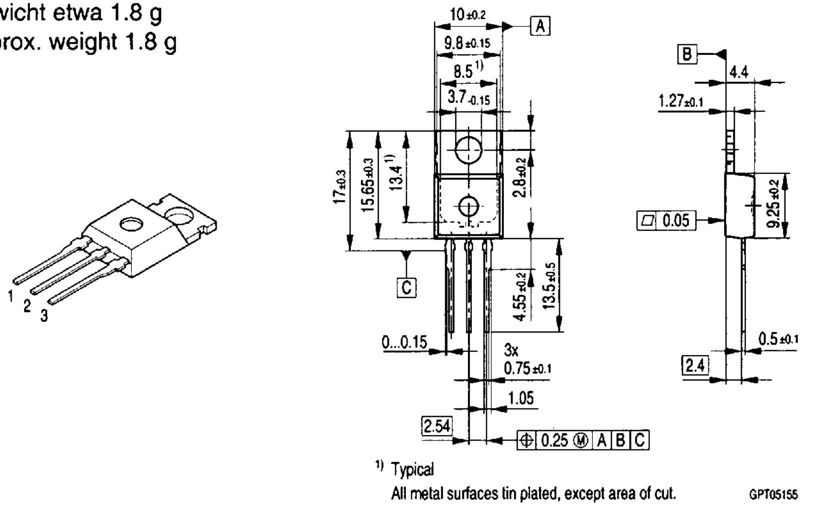


Bild 18 **Figure 18**

P-TO251-3-1
Gewicht etwa 2.0 g
Approx. weight 2.0 g

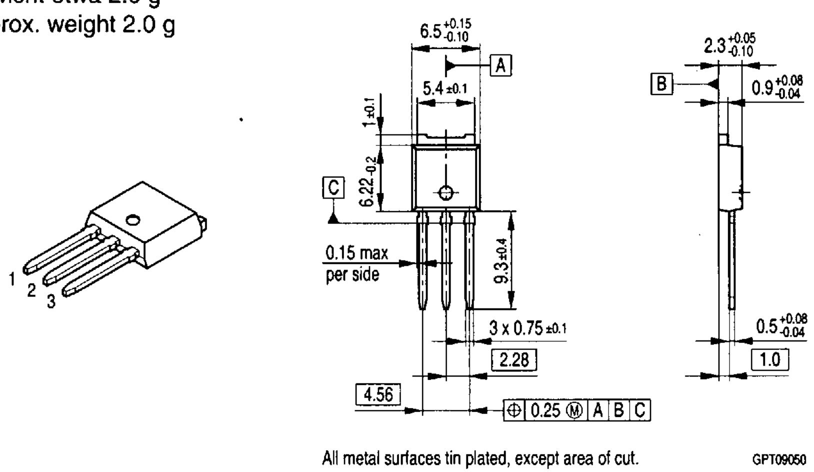
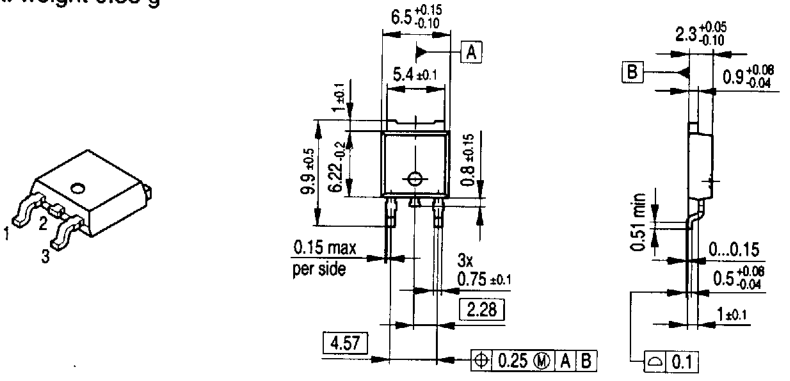


Bild 19 **Figure 19**

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P-TO252-3-1
Gewicht etwa 0.38 g
Approx. weight 0.38 g

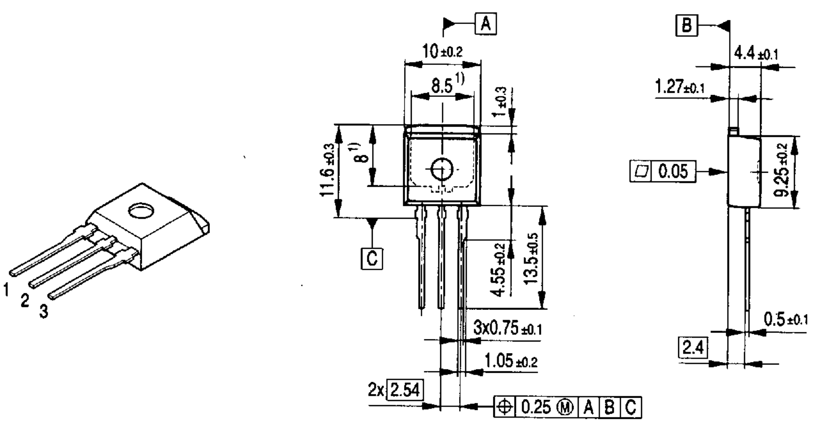


All metal surfaces tin plated, except area of cut.

GPT09051

Bild 20 **Figure 20**

P-TO262-3-1/I²PAK

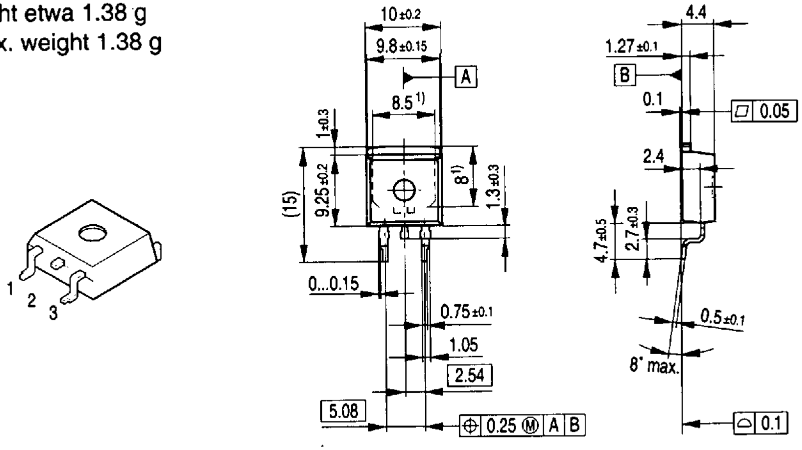


1) Typical
Metal surface min. X = 7.25, Y = 7.35
All metal surfaces tin plated, except area of cut.

GPT09244

Bild 21 **Figure 21**

P-TO263-3-2/D²PAK
Gewicht etwa 1.38 g
Approx. weight 1.38 g

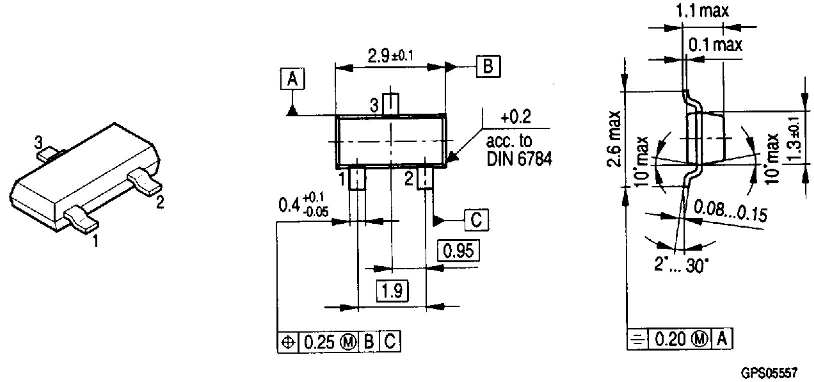


1) Typical
All metal surfaces tin plated, except area of cut.

GPT09085

Bild 22 **Figure 22**

SOT-23 (P-SOT23-3-1)
Gewicht etwa 0.01 g
Approx. weight 0.01 g



GPS05557

Bild 23 **Figure 23**

SOT-89
Gewicht etwa 0.01 g
Approx. weight 0.01 g

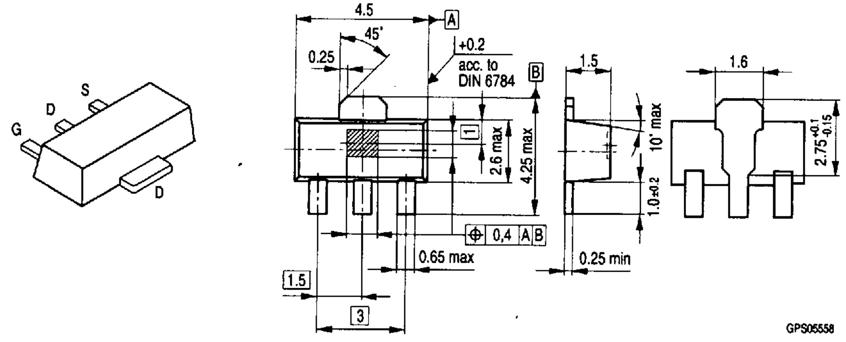


Bild 24 **Figure 24**

SOT-223 (P-SOT223-4-1)
Gewicht etwa 0.15 g
Approx. weight 0.15 g

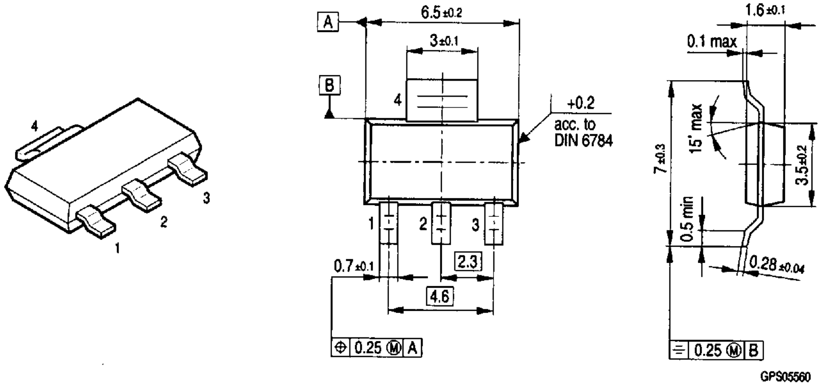


Bild 25 **Figure 25**

TO-92
Gewicht etwa 0.23 g
Approx. weight 0.23 g

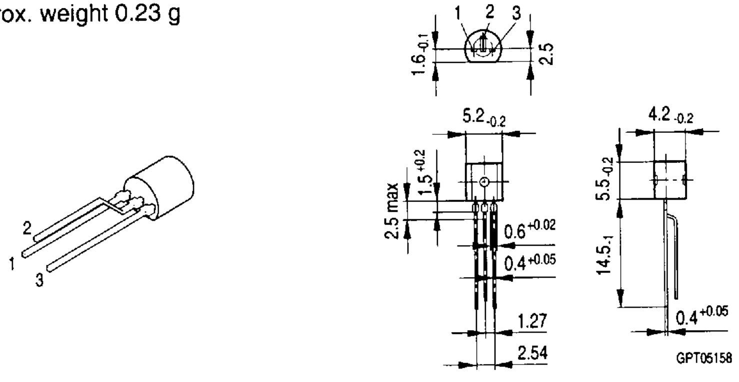


Bild 26 **Figure 26**

TO-92-E6288
Gewicht etwa 0.23 g
Approx. weight 0.23 g

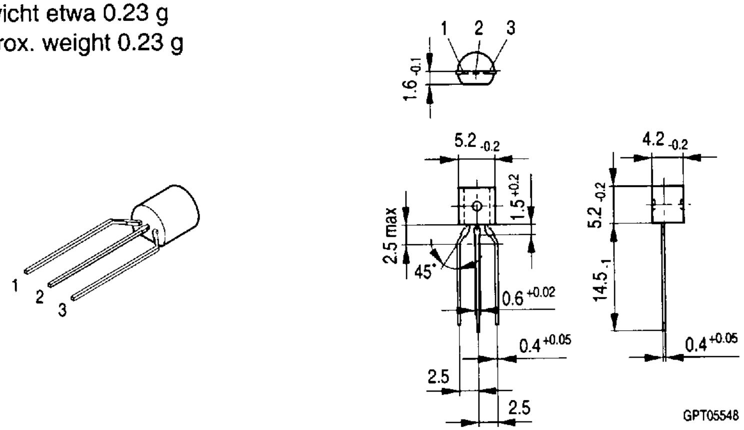


Bild 27 **Figure 27**

Sorts of Packing
Package outlines for tubes, trays etc. are contained in our Data Book “Package Information”.

SMD = Surface Mounted Device